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<b>(21) International Application Number:</b> PCT/NL00/00228 <b>(22) International Filing Date:</b> 6 April 2000 (06.04.00) <b>(30) Priority Data:</b> 99201087.6      6 April 1999 (06.04.99)      EP <b>(71) Applicant (for all designated States except US):</b> SCA HYGIENE PRODUCTS ZEIST B.V. [NL/NL]; P.O. Box 360, NL-3700 AJ Zeist (NL). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> BESEMER, Arie [NL/NL]; H. v.d. Boschstraat 111, NL-3958 CC Amerongen (NL). VERWILLIGEN, Anne-Mieke [NL/NL]; Oude Amhemseweg 234, NL-3705 BJ Zeist (NL). THORNTON, Jeffrey [US/NL]; Jagersweg 13, NL-1272 AL Huizen (NL). <b>(74) Agent:</b> JORRITSMA, Ruurd; Nederlandsch Octrooibureau, Scheveningsweg 82, P.O. Box 29720, NL-2502 LS The Hague (NL).		<b>(81) Designated States:</b> AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>Without international search report and to be republished upon receipt of that report.</i>
<b>(54) Title:</b> HYGIENIC ABSORBENT WITH ODOUR CONTROL  <b>(57) Abstract</b>  A superabsorbent material with enhanced odour control and control of bacterial growth comprises a non-acidic, alkali-neutralising compound selected from acid anhydrides, lactides, lactones and hydrolysable esters, especially cyclic acid anhydrides, lactides and lactones of $\gamma$ - or $\delta$ -carboxylic acids. The superabsorbent material can be used in hygiene products such as diapers.		

**Hygienic absorbent with odour control**

[0001] The present invention relates to a superabsorbent material for use in hygienic absorbent products such as diapers, sanitary napkins and the like, which has enhanced odour control and prevents bacterial growth and to a method of producing such material.

[0002] Superabsorbent materials of various types are known in the art. Examples are crosslinked polyacrylates and polysaccharides grafted with polyacrylates. A problem related to the use of superabsorbent materials is the odour caused by urine components, which cause superabsorbent materials to become objectionable long before there maximum absorbing capacity has been used. As the malodorous compounds are often alkaline materials such as amines, it has been proposed to improve odour control by adding acids to the superabsorbent material. However, the use of acids has disadvantages in that acids will lead to skin irritation.

[0003] US 4,685,909 discloses disposable diapers and the like containing polymeric acidic pH control agents such as cellulose phosphate and polyacrylic acid.

[0004] It has been found that a superabsorbent material with improved odour control can be produced by incorporating in or combining with the superabsorbent material a non-acidic, alkali-neutralising compound selected from acid anhydrides, lactides, lactones and hydrolysable esters.

[0005] Lactides include cyclic esters of hydroxy acids, especially  $\alpha$ -hydroxy acids such as glycolic acid and lactic acid (2,5-dioxo-1,4-dioxanes). Lactones include cyclic esters of hydroxy acids, especially  $\gamma$ - or  $\delta$ -hydroxy acids such as butyrolactone, valerolactone, gluconolactone, glucuronolactone and corresponding lactones of other sugar acids. Examples of hydrolysable esters are cellulose acetate and starch acetate. The non-acidic compound can be chemically bound to the superabsorbent material in the form of esters such as acetylated cellulose. Anhydrides are also suitable, although they are somewhat less preferred than lactides, lactones and hydrolysable esters, possibly because their susceptibility to hydrolysis is too high. They include anhydrides of carboxylic acids, especially cyclic anhydrides of dicarboxylic or polycarboxylic acids such as succinic, glutaric, maleic, citraconic, phthalic acid.

[0006] The amount of neutralising agent (e.g. lactide and lactone) to be incorporated in or to be combined with the superabsorbent material can be 1-20 % by weight, preferably 3-12 % by weight with respect to the weight of the superabsorbing polymer. The amount

acid being in the sodium salt form), the pH is lowered due to hydrolysis of the acid precursor.

[0011]

Table 2

neutralising substance	amount (mg)	amount (mmol)	pH after 1 h	pH after 2 h	pH after 5 h
none	-	-	5.75	5.81	5.92
lactide	577	4.0	5.84	5.80	5.47
$\delta$ -gluconolactone	1430	8.0	5.96	5.85	5.33
maleic anhydride	600	6.1	5.70	n.d.	5.43

**Example 2: Sanitary napkin**

[0012] In a sanitary napkin (Libresse) containing CTMP (chemically treated mechanical pulp) as absorbent, three different alkali-neutralising substances were placed in the middle of the CTMP of the napkin. 15 ml of SU was added to the napkin. After the addition of the urine, the pH was measured as six different places on the non-woven using a contact electrode, and the values were averaged. The results are summarised in the following table 3. The table shows that addition of lactide lowers the pH quickly, whereas the same amount of (maleic) anhydride results in a slower but continuing pH decrease. A direct acid (citric acid) tend to be too acidic.

[0013]

Table 3

neutralising substance	amount (mg)	amount (mmol)	pH after 2 h	pH after 5 h
none	-	-	5.76	5.67
lactide	34	0.23	4.51	4.56
maleic anhydride	23	0.23	5.36	4.32
citric acid	49	0.23	3.98	3.80

## Claims

1. Superabsorbent material comprising a non-acidic compound selected from acid anhydrides, lactides, lactones and hydrolysable esters.
2. Superabsorbent material according to claim 1, in which the non-acidic compound is selected from lactides and lactones of  $\gamma$ - or  $\delta$ -carboxylic acids.
3. Superabsorbent material according to claim 2, in which the non-acidic compound is selected from lactide, glycolide and gluconolactone.
4. Superabsorbent material according to any one of the preceding claims, in which said non-acidic compound is present in an amount of 1-20 wt.% with respect to the weight of the superabsorbent material.
5. Superabsorbent material according to any one of the preceding claims, in which the non-acidic compound is homogeneously divided in the superabsorbent material.
6. Superabsorbent material according to any one of the preceding claims, in which the non-acidic compound is chemically bound to the superabsorbent material.
7. Hygiene product such as a diaper, comprising a superabsorbent material according to any one the preceding claims.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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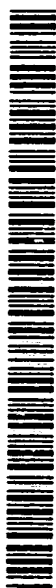
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(54) Title: HYGIENIC ABSORBENT WITH ODOUR CONTROL

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